



The Aeronautics Test Program Strategic Plan

Aeronautics Research Mission Directorate
National Aeronautics and Space Administration

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MESSAGE FROM THE DIRECTOR

NASA created the Aeronautics Test Program (ATP) in 2005. At the time, the strategic support and financial resources were lacking to ensure that strategically important aeronautics test capabilities in the United States were operating optimally and priced appropriately. Budgets for research and development (R&D) in aeronautics were continuing to decline. The suite of NASA and other U.S. test capabilities was in danger of not meeting the nation's strategic needs and of becoming inferior to foreign capabilities. NASA recognized that if it did not manage its test resources effectively, economic and competitive processes would lead, at a minimum, to waste and possibly to the loss of critical capabilities.

NASA gave ATP a lofty mandate: not just to make certain that the agency is able to meet its own aeronautics testing needs, but to ensure that the nation has the test capabilities required to advance its position of aeronautics leadership.

Now in its fourth year of operations, ATP continues to have its work cut out for it. The United States needs to validate its portfolio of aeronautics test facilities across the government and fill gaps between existing and needed capabilities. Fiscal realities imply that redundancies will have to be eliminated to free up funds. Explicit reliance relationships are required between entities that have previously operated independently: Today neither NASA, nor the Department of Defense, nor the private sector can afford to provide independent capabilities.

By reducing redundancies and costs, ATP will lay the groundwork for NASA to invest in new test technologies and new capabilities that will support U.S. aeronautics leadership in the future. This work will require a new level of cooperation and a long-term view from stakeholders. It also calls for a forward-looking strategic plan, outlined in this document, to guide its progress and offer transparency to all involved.

As ATP implements this strategic plan over the next five years and beyond, it will adhere to a certain set of core principles:

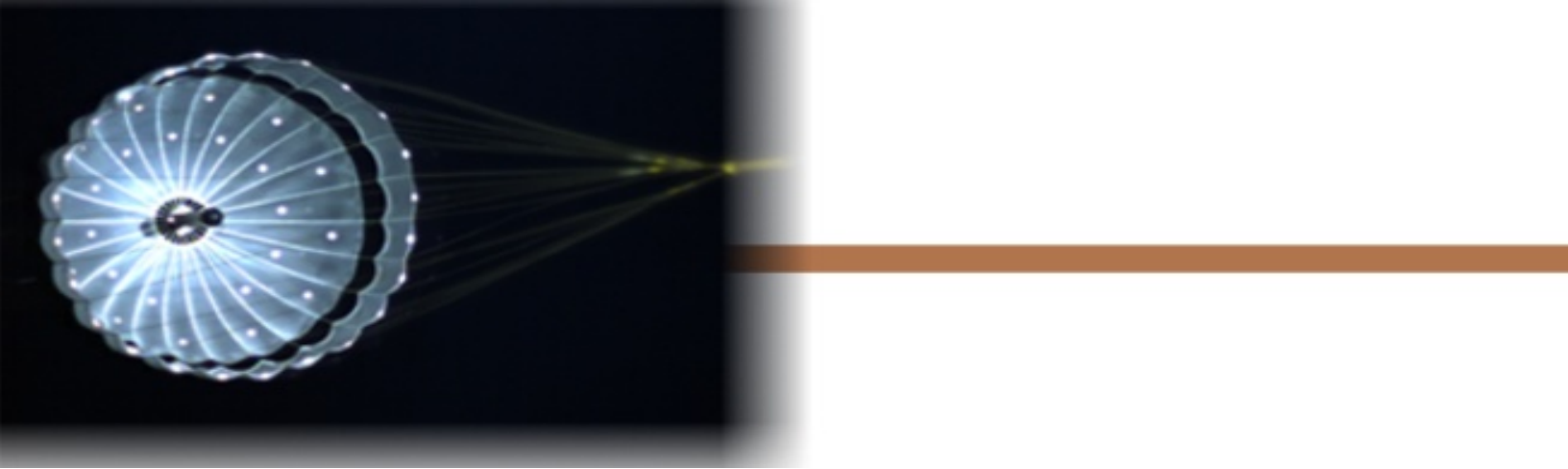
- **National stewardship.** ATP is committed to ensuring healthy and available aeronautics test capabilities not just for NASA, but for the nation.
- **Availability, not necessarily ownership.** NASA does not have to own and operate all test facilities needed, but ATP will ensure that it can access them through strategic partnerships.
- **Relevance.** Capabilities must evolve to meet future test requirements.
- **“The Big Stuff.”** ATP will focus on national-class test capabilities, rather than the quantity or breadth of smaller laboratory facilities.
- **Value.** Reliable facilities and efficient processes will help customers get the most benefit from testing.
- **Public good.** NASA has a role in providing test capabilities that are not economically viable as independent business and thus not available elsewhere.
- **R&D and T&E.** A test facility can support both R&D as well as test and evaluation (T&E) activities.

All of us in ATP look forward to meeting the challenges that lie ahead, on behalf of NASA, its partners in the aeronautics community, and the nation.



Michael W. George

Director, Aeronautics Test Program



ABOUT NASA'S AERONAUTICS TEST PROGRAM

U.S. leadership in aeronautics depends on ready access to technologically advanced, efficient, and affordable aeronautic test capabilities. These include major ground test systems — generally, wind tunnels and propulsion test facilities — as well as flight test capabilities — generally, flight vehicles and supporting infrastructure. The federal government owns the majority of the major capabilities in the United States, primarily through the National Aeronautics and Space Administration (NASA) and the Department of Defense (DoD).

The strategic importance of maintaining a balanced portfolio of test capabilities is clear. However, it has become increasingly challenging to do so in recent years due to a complex set of developments:

The customer base is shrinking. Utilization of NASA test facilities is at an all-time low and the volume of demand continues to fall. In the past five years alone, user occupancy hours have dropped by half. The decline reached about 80 percent over the past two decades, driven by cuts to NASA's aeronautics research budget and fewer R&D programs for civilian and military aircraft. A trend of substituting computational modeling for experimental testing compounds this trend. The resulting financial instability has put some of NASA's testing facilities and capabilities at risk, despite the continued (albeit more infrequent) need for these capabilities.

Prices are unstable. Full-cost recovery¹ was attempted among NASA Research Centers, making prices unpredictable. At the same time, institutional financial support that might have provided greater stability was in short supply. As a result, users have been

¹ Full-cost recovery involves charging the users within a fiscal year the full costs of operating the facility they are using — essentially taking the total budget and allocating the expenses across the users to recover the full costs. This is different than (although sometimes confused with) full-cost accounting, where the intention is to understand the full operating costs for a capability, regardless of how it is paid for.

burdened with broader non-recurring infrastructure costs when utilization of facilities has been low. The effect has often been prices that were noncompetitive and incommensurate with the value that facilities offer users.

Finances are constrained. Fiscal constraints limit the resources available to keep government test capabilities in good condition and staff well trained. Inadequate funds for maintenance and repair have created a significant backlog and declining facility conditions.

The workforce is changing. An aging and shrinking workforce is leading to an increased risk of losing the world-class operating knowledge and expertise created over the past decades upon which test capabilities rely.

An overall strategy has been lacking. Control of aeronautics test facilities is complex: NASA centers, programs and headquarters have authorities, responsibilities and objectives that are not always congruent. Nor has there been a strategic vision and plan for aeronautics test technology at the agency or federal level. This resulted in an absence of long-range, NASA-wide strategic management.

NASA's Aeronautics Test Program (ATP) was created to take on these challenges. The current and future ability of the United States to develop, produce, and sustain important aeronautical vehicles continues to depend on the use of aeronautics test systems — no matter how infrequently — to reduce cost and performance risks while advancing aeronautics knowledge. NASA has tasked ATP with managing and funding a set of test capabilities deemed critical to both the agency and the nation.

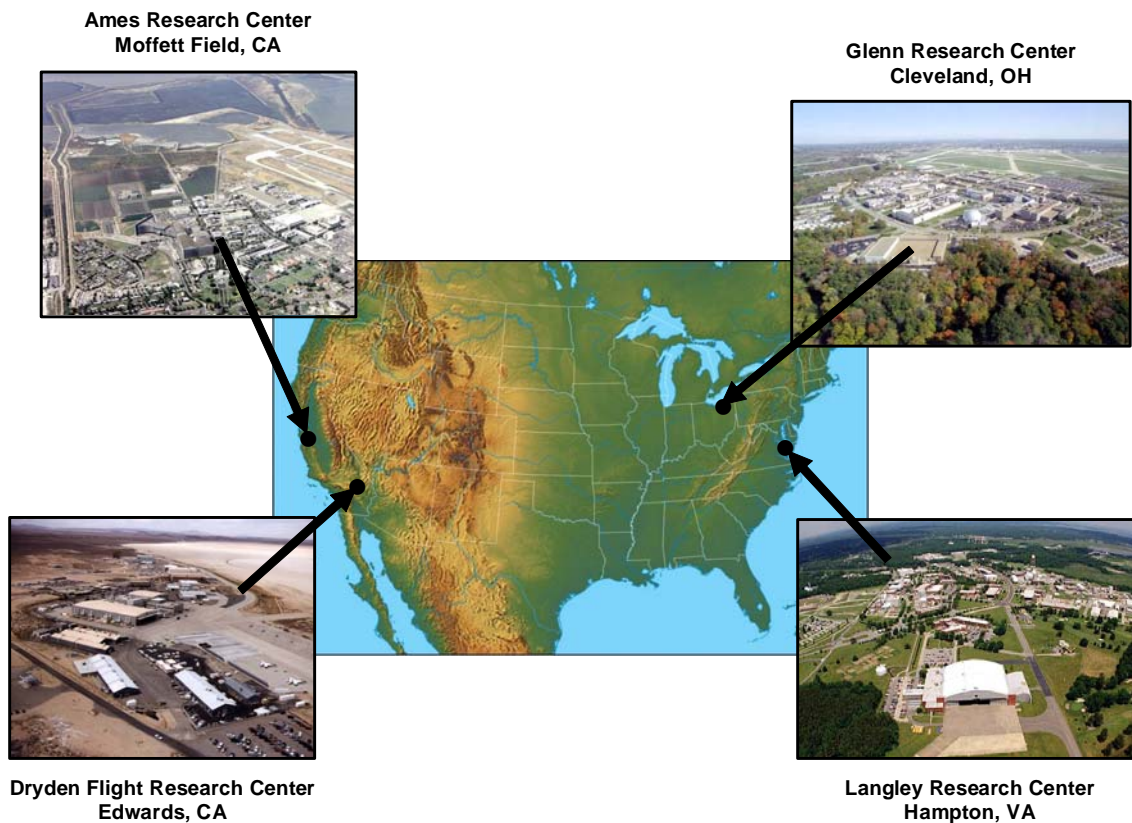
ATP's mandate is to ensure that customers have access to the test capabilities they need when they need them and at a reasonable cost. Reporting to the Aeronautics Research Mission Directorate, ATP:

- manages NASA's ground and flight test capabilities at a strategic level, applying centralized policies and procedures across NASA research centers
- ensures that these assets are operating efficiently and cost-effectively
- determines the minimum set of core testing capabilities
- maintains and improves core test capabilities
- works with other government agencies to optimize the national capability

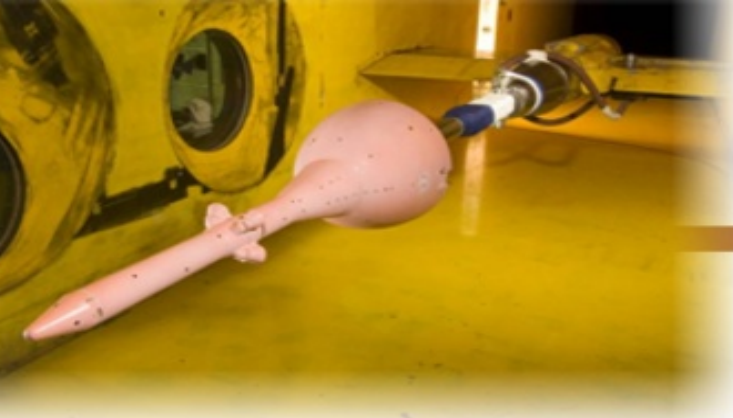
ATP's customers, in the broadest sense, fall into two groups. The first consists of the *users* of test capability. This group includes NASA, the Department of Defense, the Federal Aviation Administration, U.S. industry, and select foreign users.

The second group includes *stakeholders* from the U.S. federal government. Examples are the Aeronautics Research Mission Directorate, the rest of NASA, the Office of Management and Budget, the Office of Science and Technology Policy, the White House, and Congress.

ATP also supports and collaborates with other entities that were established to address related challenges. One is the NASA/DoD National Partnership for Aeronautical Testing (NPAT). Another is the Aeronautics Science and Technology Subcommittee of the Committee on Technology of the National Science and Technology Council. This subcommittee recently chartered the Infrastructure Interagency Working Group (IIWG) to define the testing infrastructure required to meet the goals and objectives of the National Plan for Aeronautics Research and Development.



Location of ATP Assets



ATP'S VISION AND MISSION

VISION

ATP's vision is a **balanced portfolio of aeronautics ground and flight test capabilities that advance U.S. leadership in aeronautics in the short and long term.**

"Balanced" implies tradeoffs between different characteristics of the portfolio and a variety of factors that shape it:

- Demand versus capacity
- Near-term versus far-term needs
- Cost versus benefit
- New test technologies versus established ones
- Productivity for T&E versus flexibility for R&D
- Depth versus breadth of capability
- Internal versus external capabilities (e.g., NASA and the U.S. Department of Defense)

ATP's vision does not necessarily require test capabilities to be located within NASA. But it does call for them to be available in a way that addresses U.S. strategic concerns and fosters U.S. competitiveness in aeronautics.

MISSION

To achieve this vision, ATP exists to:

- Provide strategic management **guidance and recommendations** to the NASA ARMD Associate Administrator and NASA Research Center Directors concerning NASA aeronautics ground and flight test capabilities
- **Represent NASA's and advocate for the nation's interests** related to ground and flight test capabilities with U.S. agencies and departments, foreign governments, and user and management communities within industry and academia
- Provide **strategic direction** to test capability managers
- Provide **financial support** to NASA test capabilities by funding
 - expenses for testing and support facilities
 - major maintenance, repair, and improvements
 - strategic workforce initiatives, and
 - test technology development

This four-part mission ensures that customers from NASA; the Department of Defense; and other government, industry, and academic entities in the United States can rely on a readily available and capable portfolio of important aeronautics test capabilities.



ATP'S VALUES

ATP is guided by NASA's core values of **safety**, **teamwork**, **integrity**, and **mission success**. In addition, ATP has five core values specific to its vision and mission:

- **Excellence** in the knowledge and practice of aeronautics testing
- Delivery of **high-quality** data and testing support to our customers
- **Safe** and **reliable** test capabilities
- Long-range **vision**
- **Efficient** stewardship of public funds



ATP'S STRATEGIC GOALS

STRATEGIC GOAL #1: ENSURE THAT TEST CAPABILITIES MEET CURRENT AND PROJECTED CUSTOMER REQUIREMENTS

ATP will provide the optimal set of aeronautics test capabilities, given the resources it has available, for current and future needs. At the same time, it will ensure that the nation has access to the capabilities necessary to advance aeronautics leadership.

To achieve this two-pronged goal, ATP will conduct extensive, ongoing analysis. It will assess future national needs, current national capabilities, redundancies, and gaps. It will also evaluate the risks—both to the program and to U.S. competitiveness — of permitting certain gaps in test capabilities and of eliminating redundancies. With this information in hand, it will weigh the costs and benefits of capabilities against testing needs and make appropriate decisions, investing in upgrades and divestitures where advantageous.

Given that both the demand and the funding for aeronautics testing have decreased, new alliances with the Department of Defense and other potential partners will be key to this effort. In the future, ATP may even forge such alliances with industry and foreign allies. By pooling the capabilities of diverse partners, ATP will ensure the best possible servicing of national needs.

STRATEGIC GOAL #2: SATISFY TEST CUSTOMERS THROUGH OPERATIONAL EXCELLENCE

ATP and the relevant NASA research centers will understand, meet, and exceed their customers' current expectations along multiple dimensions — providing available, productive, reliable, and secure facilities; high-quality data; and cost efficiency. It will also anticipate and meet customers' major future needs. The research centers are primarily responsible for operating NASA's test

capabilities. ATP's role will be to provide oversight and facilitate the ongoing operational improvement of the capabilities in its portfolio.

Continually appraising the expectations of customers for productivity, flexibility, and data quality, ATP will evaluate the performance of ATP facilities against these expectations. It will also identify the new or improved testing capabilities and technology that will assure this high level of customer satisfaction and invest in them accordingly. In achieving this goal, ATP will help secure the ongoing business of NASA projects, the government, and other clientele for NASA's test capabilities.

STRATEGIC GOAL #3: SUSTAIN ATP'S CAPABILITIES OVER THE LONG TERM

ATP directly controls the bulk of the funds for maintaining and improving NASA aeronautics test capabilities over time. ATP facilities are typically 30 to 60 years old. At the same time, funding income for testing is decreasing. Together, these two factors will compel ATP to make tough decisions about which test capabilities to retain in its portfolio. Delay in making these decisions, or failure to do so altogether, will likely be at a cost to the nation — either in the loss of other capabilities due to closures or system failures, or in unnecessary expenditures.

ATP will maintain situational awareness of the current conditions and future life-cycle costs of its aeronautics test capabilities. Armed with this knowledge, it will manage maintenance costs (planned and deferred) by investing in maintenance and mothballing, closing, abandoning, or replacing facilities.

STRATEGIC GOAL #4: MAINTAIN WORKFORCE EXCELLENCE

The workforce that operates ATP capabilities is essential to responsive, safe, and productive testing. NASA's research centers manage that workforce. Consequently, here ATP will provide oversight in support of the centers.

The large staff reductions of the past few decades, as well as an emphasis on contracting at some Centers, have led to questions about the workforce's long-term viability. To address this concern, ATP will identify the necessary quality and balance of specialized knowledge and skills to provide the needed aeronautics test capabilities. It will then work to ensure that first-rate talent and the required skill mixes are continuously available.

STRATEGIC GOAL #5: ENSURE BALANCED BUDGETS

Currently, almost half of the supporting revenue for ATP's ground test facilities comes from customer fees. Flight test capabilities will initiate customer fees in FY10. But in a given fiscal year, customer programs can experience unanticipated delays and cancellations, making those revenue streams unreliable. Over multiple years, the testing needs of programs ebb and flow, causing revenue from individual facilities to fluctuate dramatically.

To keep its budgets balanced, ATP will work with facility managers to project those revenue streams as accurately as possible and in a timely manner. Its first steps in accomplishing this will be to maintain situational awareness of finances throughout the fiscal year and develop realistic projections of short- and long-term usage of facilities. At the same time, it will address the budgetary effects of revenue that fluctuates due to variation and uncertainty in demand.

Using its revenue-stream projections, ATP will distribute funds across operations, maintenance, and investments in a balanced, but strategic manner. It will manage its annual budgets relative to long-term strategic goals.

STRATEGIC GOAL #6: PROVIDE COHERENT COST AND PRICING STRUCTURES

Past experience has shown that full-cost recovery and rapid price fluctuations greatly aggravate the effect of unsteady revenue streams on pricing and facility management. These in turn undermine customer confidence and make it difficult to plan for usage of facilities. Budgeting processes applied in the past varied across NASA's research centers, which obscured the actual costs of various testing capabilities, preventing meaningful comparisons of different facilities.

ATP will address these issues by continuing its ongoing work with the centers to improve cost and price models. It will ensure the transparency of full-cost accounting. It will also align financial structures and reporting mechanisms across similar test centers and facilities in NASA and the Department of Defense. The outcome will be more reasonable fees for customers, with much greater consistency and stability in both pricing and cost.



STRATEGIES FOR IMPLEMENTATION

ATP's six strategic goals provide a concise description of ATP's priorities. But to realize those priorities, ATP will need to pursue specific supporting objectives for each goal. Both actionable and measurable, the objectives reveal how ATP interprets a given goal. Each objective in turn has associated performance measures and ideal targets that will allow ATP to assess its progress clearly.

To achieve these objectives over the next five years, ATP will pursue a carefully developed set of initiatives. Each initiative will drive the performance measures for the objective(s) it supports toward the ideal targets.

The initiatives are grouped into three main categories:

Assessments: To make good decisions about investments, ATP must have accurate and timely information. This group of initiatives focuses on assessing the current and future state of NASA's and the nation's strategic aeronautics test needs and available capabilities.

Decision Frameworks: Initiatives in this group will help ATP make well-considered and transparent programmatic decisions. They enable pertinent information to be assembled into a single document so that options are easier to weigh and their underlying rationales more readily apparent.

Investment Activities: This group of initiatives consists primarily of efforts that will enable ATP to distribute its funds effectively. It also includes investments in coordination with partners to implement reliance and ensure access. In a more narrow sense, these activities will help ATP choose which capabilities it must support. In a broader sense, they will assist ATP in finding the correct balance of funding across supporting operations,

maintaining and improving facilities, developing the workforce, and building new capabilities.

The decision frameworks in particular will play a critical external role: They will allow stakeholders insight into ATP's decision-making process. It is vital that this process be transparent to everyone with interests in the aeronautics testing community. The research centers, for example, need to understand ATP's thinking about how the specific test facilities they run fit into the overall picture. Partners, such as the Department of Defense, need to be assured that ATP's decisions are aligned with their interests. Elected representatives need to know that ATP has considered all of the options for facilities and is delivering the required test capabilities. ATP's customers need to be able to anticipate what capabilities will be available to them in the future.



GUIDING PRINCIPLES FOR LONG-TERM STRATEGIC PLANNING

This strategic plan serves as a guide for ATP as it advances toward its vision. At the same time, it is the first product of a dynamic effort that ATP sees as continuing well into the future. Policy, resources, technology, and the needs of aeronautics test customers will inevitably change over time. ATP is committed to staying abreast of these developments and adapting to them as needed. A certain degree of flexibility in strategic planning will be vital to its success in fulfilling its mission.

The following principles will guide the plan's evolution in the years to come:

- **Strategic planning is a sustainable, continuous process.** It helps the management of both ATP and ARMD to state their strategic goals over time, define the objectives to meet those goals, and measure progress against those objectives. Strategic planning also permits management to determine on an ongoing basis how to address long-term strategic concerns.
- **ATP's strategic planning process will include regular updates and more substantial reviews every few years.** The updates will inform the annual ATP program reviews, providing a way to determine and explain programmatic and budgetary needs, investment decisions, and outcomes.
- **The implementation of ATP's strategic plan will recognize and support other planning and management efforts.** Some of these efforts are being carried out by the Executive Branch (e.g., the President's Management Agenda, the PART Program, the National Aeronautics R&D Plan, and the National Aeronautics RDT&E Infrastructure Plan). They also include NASA's internal management tools, processes, and reviews.

